



MEDICAL BUFFER

CNS ESSAY

Physiology

1-Somatic sensory area I (S1) function is(1)..... and example for it is(2)..... and its number is(3)...

- (1) Perception of Epicretic (fine sensation)
- (2)
 - Fine touch
 - Deep sensations
 - Fast pain
 - Fine degrees of temperature
- (3) area 3,1,2

2-Somatic sensory area II (S2) function is(1)..... and(2)..... its number is.....(3)....

- (1) May be a center for pain
- (2) Sensory control of motor function (sensory motor coordination)
- (3) area 40

3-Sensory somatic association area function is(1)..... and its number is(2)...

- (1) Interpretation of all information (stereognosis)
- (2) area 5,7

4- The body representation of somatic sensory area I is(1).... And(2)

- (1) Crossed
- (2) Inverted

5- The modality of somatic sensory area I is(1).... Anteriorly and(2).... Posteriorly

- (1) Tactile sensation
- (2) Kinesthetic sensation

Parasitology:

1- List 8 parasites that can affect CNS:

- **Acanthamoeba spp**
- **Naegleria fowleri**
- **Trypanosome brucei**
- **Taenia multiceps**
- **T.solium**
- **E. granulosus**
- **E. multicularis**
- **Schistosoma mansoni**

2- Compare between T.solium & T.multiceps:

	<i>Taenia solium</i>	<i>Taenia multiceps</i>
Habitat	Adult inhabits the intestine of man.	Adult inhabits intestines of dogs and wild canines
Definitive host	Man	Dogs and wild canines
Intermediate host	Pig and occasionally man	Herbivores, rodents and occasionally man.
Infective stage	Eggs \ cysts	Eggs
Mode of infection	Man becomes infected by ingestion of eggs\ cysts.	Man becomes infected by ingestion of eggs.

3- Mention mode of transmission of acanthamoeba spp:

- Inhalation of aerosol contaminated with cyst or trophozoite.
- Direct spread through broken or infected eye
- Contact lens use
- The trophozoite & cyst may then reach the target tissue via the blood

4- What is the causative parasite & clinical manifestations of Acute primary amoebic meningoencephalitis?

- **Naegleria fowleri**
- **Clinical manifestations:** similar to purulent bacterial meningitis but with no response to antibacterial drugs.

Onset is acute

The incubation period vary from 2 to 15 days

Sorethroat & rhinitis may occur

Increase intra cranial tension

5- Discuss diagnosis & prevention of African sleeping sickness:

- **Diagnosis:**

1- Clinical picture

2- Direct demonstration of the parasite:

Specimen

Microscopic examination

CSF examination (elevated protein - high IgM titre - presence of morula cells - increase total cell count more than 5)

3- Indirect serological tests (become +ve from 12th day of infection)

- **Prevention:**

1- Treatment of patients

2- Chemoprophylaxis (antrypol)

3- Destruction of glossina & its breeding place

6- Evaluate treatment of African trypanosomiasis:

- **Hemolymphatic stage:** (cannot pass BBB)

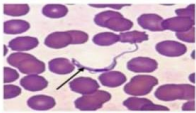
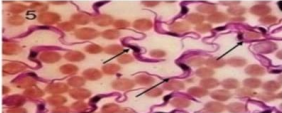
Suramin(antrypol)

Pentamidine

- **Meningoencephalitic stage:** (pass BBB)

Melarsoprol (arsobal)

7- Compare between gambiense & rhodesian trypanosomiasis:

Trypanosoma brucei causing Sleeping Sickness	
West Africa <i>T.brucei gambiense</i>	East Africa <i>T.brucei rhodesiense</i>
	
Less plentiful Cannot live in lab animals	More plentiful Can live in lab animals Nucleus is shifted posteriorly
Reservoir host: goats, cattle & pigs	Reservoir host: wild game animals
Transmitted by: <i>G.palpalis</i>	Transmitted by: <i>G.morsitans</i>

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- 8- A 67-year-old man presented to hospital with rapidly progressive deterioration, an unsteady gate, urinary incontinence and increased somnolence. • The patient was a retired engineer who had been visiting Ghana for a few weeks annually over the past four years. He had no traveled else where in Africa. He had suffered numerous insect bites on his trips. Symptoms began 10 months prior to admission. • On admission he was confused, drowsy, irritable and there was memory impairment. • Routine laboratory studies revealed:- a thrombocytopenia with normal haemoglobin and WBC's count. -CSF examination revealed a high protein level, 35 lymphocytes and 3 polymorphonuclear leucocytes. - The bacterial culture was negative
- What is the most suitable diagnosis? And why ?**
- Gambian trypanosomiasis, African sleeping sickness caused by *T.brucei gambiense*.

- 9- A 54-year-old male was referred to eye clinic a 2-week history of left eye pain associated with blurred vision, photophobia and excessive lacrimation. • His past ocular and medical history were significant for daily soft contact lens wear. • Before the arrival to our clinic, the patient had been unsuccessfully treated with acyclovir, ibuprofen, topical antibiotic, for presumed herpes simplex virus keratitis. • The symptoms worsened despite the topical therapy. • A corneal scraping was performed and examined in normal saline wet mount preparation. It demonstrated motile trophozoites and cyst. • No bacteria or fungi were isolated in culture. The corneal scraping was repeated after 3 days to reconfirm the diagnosis. • Slit lamp examination showed a large epithelial defect centrally with a ring infiltrate. He treated with steroids, antibiotics, oral valacyclovir, oral and topical non-steroidal anti-inflammatory drugs

What is your provisional diagnosis?

Granulomatous amoebic keratitis and corneal ulceration

What is the causative organism?

- Acanthamoeba spp. (free living amoeba)

Mention other disease can be caused by this organism?

- Granulomatous amoebic encephalitis (GAE)

Anatomy:

1- Enumerate CN nuclei of oculomotor & type of fibers of each:

- Motor nucleus of oculomotor (GSE)
- Edinger westphal nucleus (GVE)

2- Enumerate CN nuclei of trigeminal & type of fibers of each:

- Motor nucleus (SVE)
- Spinal nucleus & tract (GSA)
- Main sensory nucleus (GSA)
- Mesencephalic nucleus (GSA)

3- Enumerate the 3 posterior divisions of mandibular nerve:

- Auriculotemporal nerve
- Lingual nerve
- Inferior alveolar nerve

4- Enumerate CN nuclei of facial & type of fibers of each:

- Motor nucleus (SVE)
- Superior salivary nucleus (GVE)
- Solitary nucleus (SVA)
- Spinal nucleus & tract of trigeminal (GSA)

5- Enumerate nuclei of accessory nerve & type of fibers each:

- Nucleus ambiguous (SVE)
- Spinal nucleus (GSE)

6- Describe anatomical distribution of greater petrosal nerve:

- Parasympathetic preganglionic fibers to lacrimal gland & the glands of nose, palate & the nasopharynx
- It carries taste sensation from the palate

7- Enumerate nuclei of glossopharyngeal nerve & type of fibers each:

- Nucleus ambiguus (SVE)
- Inferior salivary nucleus (GVE)
- Solitary nucleus (SVA) (GVA)
- Spinal nucleus & tract of trigeminal (GSA)

8- Enumerate nuclei of vagus nerve & type of fibers each:

- Nucleus ambiguus (SVE)
- Dorsal nucleus of vagus (GVE)
- Solitary nucleus (SVA)(GVA)
- Spinal nucleus & tract of trigeminal (GSA)

9- Enumerate parasympathetic nuclei in the brain stem:

- Edinger westphal nucleus
- Superior salivary nucleus
- Inferior salivary nucleus
- Dorsal vagal nucleus

10- Mention the external features of the anterolateral surface of medulla?

- Anterior median fissure
- Pyramid
- Anterolateral sulcus
- Olive
- posterolateral sulcus
- Inferior cerebellar peduncle

11- Mention the external features of the posterior lower part (closed medulla) surface of medulla?

- Posterior median sulcus.
- Gracile tract & tubercle
- Cuneate tract & tubercle
- Inferior cerebellar peduncle.

12- Mention the external features of the posterior upper part (open medulla) surface of medulla?

- Posterior median sulcus in midline
- hypoglossal trigone
- lower vestibular
- vagal triangle
- Medullary stria

13- Mention the external features of the anterior surface of the pons?

- Transverse streaks
- Basilar sulcus
- Raised ridge
- Trigeminal nerve
- Middle cerebellar peduncle

14- Mention the external features of the posterior surface of the pons?

- Medial eminence
- Facial colliculus
- Upper Vestibular area
- The medullary stria

15- Mention the external features of the posterior aspect of the midbrain and their function?

- Superior colliculus are centers for visual reflexes
- Inferior colliculus are lower auditory centers.
- Emergence of trochlear nerve

Histology:

1- Describe histological structure of cornea?

It is the transparent, avascular and highly innervated anterior (1/6) portion of the fibrous coat

It is composed of 5 distinct layers:

- 1-Corneal epithelium
- 2-Bowman's membrane
- 3-Stroma (substantia propria)
- 4-Descemet's membrane
- 5-Corneal endothelium.

2- Mention the factors of transparency of the cornea?

- Nonvascular
- Parallel collagen fibres

3- How does the cornea adapt to its function?

- Corneal epithelium (stratified squamous non keratinized epithelium)
- Bowman's membrane
- Transparent

4- Describe the changes that occur at the limbus (corneoscleral junction)

- The corneal epithelium becomes continuous with that of the conjunctiva.
- Bowman's membranes stop at the limbus and is replaced by lamina propria of the conjunctiva.
- The collagen lamellae become irregular, at this point there is a circular canal surrounding the limbus, called canal of Schlemm.
- Descemet's membrane and its simple endothelium are replaced with a system of irregular endothelium-lined channels called the trabecular meshwork
- Descemet's membrane & endothelium end

5-

	The axon	The dendrites
Number	Single.	Multiple.
Thickness and Length	<u>Thin & long.</u>	<u>Thick & short.</u>
Diameter	It has a <u>smooth</u> contour & constant diameter along its length.	<u>Short and irregular with wide base & tapering ends.</u>
Contour	<u>Smooth.</u>	<u>Irregular</u>
Branching	It branches at its terminal end only i.e. " <u>terminal arborization.</u> "	They give <u>extensive branching</u> along their course (have <u>dendritic spines</u>)
Content	Contains neurofibrils)no Nissl granules or Golgi.	Contain neurofibrils and Nissl granules but <u>no Golgi.</u>
Conduction of nerve impulses	It carries nerve impulses away <u>from</u> the cell body (centrifugal)	They carry nerve impulses <u>to</u> the cell body (centripetal).
Myelination	<u>May be myelinated</u>	<u>Not myelinated</u>

6- Classification of the neurons?

* According to the number of processes (Polarity):

- Unipolar nerve cells
- Pseudo unipolar nerve cells
- Bipolar nerve cells
- Multipolar nerve cells

* According to the length of their axons:

- Golgi type I neurons
- Golgi type II neurons

* According to the function:

- sensory neurons
- motor neurons
- interneurons

Biochemistry:

Classify neurotransmitters based on chemical nature with example.

	Examples
Amino acids	glycine, glutamate
Monoamines	serotonin, epinephrine, dopamine
Peptides	substance P, opioids
Purines	ATP, GTP
Other	nitric oxide, carbon monoxide

2-Classify neurotransmitters based on function with example.

Function	Examples
Excitatory (leads to depolarization)	Glutamate
	Aspartate
	Histamine
Inhibitory (leads to hyperpolarization)	Serotonin
	Glycine
	Gamma amino butyric acid (GABA)
	Taurine
Excitatory & Inhibitory (leads to depolarization and hyperpolarization depending on type of receptor)	Substance P & Endogenous opioid peptides
	Acetylcholine
	Epinephrine (Adrenaline)
	Dopamine
	Norepinephrine (Noradrenaline)
	NO

3-On biochemical bases describe Mechanism of action& pathophysiology of substance P (SP).

Substance P works through a G protein-coupled receptor, either through the IP3/DAG pathway or the cAMP pathway depending on cell type:

- 1- it assists in transmitting pain signals
- 2-it potentiate smooth muscle contraction of gastrointestinal tract
- 3- In response to skin damage,

4-The catabolic end product of catecholamine is the(1).... and it is urinary excretion levels are used as an indicator in the diagnosis of(2)..... ,(3).....

- (1) Vanylmandelic acid (VMA)
- (2) Adrenal pheochromocytoma
- (3) Neuroblastoma

5-What is the treatment of Myasthenia gravis?

- 1-acetylcholinesterase inhibitors
- 2-Immunosuppressive medications
- 3-Plasma Exchange (Plasmapheresis)
- 4-high-dose intravenous immunoglobulin

7- The catabolic end product of catecholamine is the(1).... and it is catabolized by(2)... in circulation and by(3).... In nerve endings

(1) Vanylmandelic acid (VMA)

(2) Catechol-O-methyltransferase (COMT)

(3) Monoamine oxidase (MAO)



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